

REMARKS/ARGUMENTS

The Office Action

- (1) rejected claim 66 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter;
- (2) rejected claims 56, and 59-61 under 35 U.S.C. 102(b) as being anticipated by Collins et al. (U.S. Patent No. 5,556,501);
- (3) rejected claims 14-15 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622);
- (4) rejected claim 19 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622) in view of DeOrnellas et al. (WO99/25568);
- (5) rejected claim 19 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622) in view of Keizo (JP07-130712A);
- (6) rejected claims 56, 59-61, and 65-66 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622) in view of Collins et al. (U.S. Patent 5,556,501);
- (7) rejected claims 14-15, and 65-66 under 35 U.S.C. 103(a) as being unpatentable over Collins et al. (U.S. Patent No. 5,556,501);
- (8) rejected claim 19 under 35 U.S.C. 103(a) as being unpatentable over Collins et al. (U.S. Patent No. 5,556,501) in view of DeOrnellas et al. (WO99/25568);
- (9) rejected claim 19 under 35 U.S.C. 103(a) as being unpatentable over Collins et al. (U.S. Patent No. 5,556,501) in view of Keizo (JP07-130712A).

(1) Regarding claim 66 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, Applicants have modified the claim to overcome the Examiner's rejection.

(2) Regarding claims 56, and 59-61 under 35 U.S.C. 102(b) as being anticipated by Collins et al. (U.S. Patent No. 5,556,501), Applicants submit that Collins et al. discloses heating the chamber wall for process performance (col. 7, lines 46-48), instead of heating the chamber wall so that the etch materials removed from the wafer and being deposited on the chamber wall surface form a stable layer that does not flake off (as claimed by the present invention).

The chamber wall heating of Collins et al. is further disclosed in detailed in section 11 (Chamber Temperature Control, col. 20, line 55). However, Collins et al. only describes that the chamber wall temperature ranges from +120°C to -150°C. This is in contrast to the present invention which has the express purpose of preventing flaking from the chamber wall, with the temperature range of 300°C and above.

Furthermore, taking into account the references disclosed by Collins et al., U.S. Patent Nos. 4,872,947 and 4,842,683 (col. 21, lines 2-3), Applicants submit that U.S. Patent No. 4,872,947 only mentions a wall temperature range of 100°C – 200°C to ensure the deposition of a hard film instead of a poor, particulate-generated film (col. 11, lines 32-37). Applicants submit that teaching in U.S. Patent No. 4,872,947 does not anticipate the present invention due to the failure to elucidate the mechanism of the film flaking, together with a different temperature range.

U.S. Patent No. 4,842,683 only teaches the chamber wall heating to prevent formation of wall deposits (col. 5, lines 65-68), also with a different temperature range of >70°C (col. 14, lines 40-44).

Thus, Applicants submit that the teaching in Collins et al. of heating the chamber wall cannot anticipate the present invention of improving adhesion and preventing flaking by heating the chamber wall, especially in the temperature range of above 300°C.

(3, 7) Regarding claims 14-15 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622), or claims 14-15, and 65-66 under 35 U.S.C. 103(a) as being unpatentable over Collins et al. (U.S. Patent No. 5,556,501), Applicants submit a Declaration evidencing the inventiveness of the temperature range of above 300°C. Applicants submits that temperature range of above 300°C shows the novelty and non-obviousness of the present invention, and not a routine experimentation for optimization

or workable ranges. Not only is the link between the chamber wall temperature and the adhesion strength of the deposited layers not obvious, but the discovery of the temperature range of 300 to 500°C is further proof of the present inventiveness.

(4, 5, 8, 9) Regarding claim 19 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622) or Collins et al. (U.S. Patent No. 5,556,501), in view of DeOrnellas et al. (WO99/25568), or Keizo (JP07-130712A), Applicants submit that the present invention is not strictly an etch process, but a method to operate an etch reactor or a method to improve an etch process by preventing particulate defects. The present invention focuses on the prevention of films flaking off from the chamber wall onto the workpiece during an etch process. The only relationship between the present invention and the etch process is that the flakable films is the residue or by-product of an etch process, which leaves the etch workpiece and deposits on the chamber wall.

Thus, Applicants submit that even though Imai et al. and Collins et al. provide the chamber wall heater, and DeOrnellas et al. or Keizo provides the Pt etch process, the combination of these references cannot anticipate the present invention of preventing films flaking off from the chamber wall by heating the chamber wall above a critical temperature. Further, Imai et al. is silent with respect to his temperature capability so a normal temperature of typical etch chamber wall of up to 100°C can be assumed, and the chamber wall heating of Collins et al. can only heat up to 120°C, and, thus, persons skilled in the art could not even stumble on the present invention by accident.

(6) Regarding claims 56, 59-61, and 65-66 under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (WO97/27622) in view of Collins et al. (U.S. Patent No. 5,556,501), Applicants submit that heating is not identified by either Imai et al. and Collins et al. to be provided to a degree such that “any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material” as claimed in claim 56, or “etch materials deposited on the surface with the heater form a stable layer of material that does not flake off onto the workpiece” as claimed in claims 59-61. Further, Applicant submit secondary Declaration evidence showing unexpected results of heating to a range of above 300°C versus a normal operation temperature of about 100°C.

In summary, Applicants submit that none of these references, either singly or in combination can anticipate nor render these claims obvious.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

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Respectfully submitted,

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